M013e: A-FRAME AND SUSPENSION TRAVERSE

TSP Number/Title	M013e: A-Frame and Suspension Traverse
Effective Date	Implement next class iteration upon receipt
Supersedes TSP(s)/Lessons	None
TSP User	The following courses use this TSP: Mountain Instructor Qualification Course (MIQC) Basic Military Mountaineering Course (BMC) Assault Climbers' Course (ACC)
Proponent	United States Army Alaska, Northern Warfare Training Center
Improvement Comments	Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: ATTN: TRAINING ADMINISTRATOR COMMANDANT USARAK NWTC 1060 GAFFNEY ROAD #9900 FORT WAINWRIGHT AK 99703-9900
Security Clearance/Access	Public domain
Foreign Disclosure Restrictions	The Lesson Developer in coordination with the USARAK NWTC foreign disclosure authority has reviewed this lesson. This lesson is releasable to foreign military students from all requesting foreign countries with Approval of Commandant USARAK NWTC.

Purpose

This training support package provides the instructor with a standardized lesson plan for presenting instruction for:

Task Number	Task Title
VIII.0806	Suspension Traverse

Technique of Delivery

Lesson Number	Instructional Strategy	Media
M013f	Class and Practical Exercise	None

This TSP contains

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SECTION I **ADMINISTRATIVE DATA**

All courses including this lesson

Course Number	Course Title
NA	Mountain Instructor Qualification Course
NA	Basic Mountaineer Course
NA	Assault Climber Course

Task(s) Taught or Supported

Task Number	Task Title
VIII.0806	Rope Installations (suspension traverse)

Task(s) Reinforced

Task Number	Task Title
VI.0200	Risk Management for Mountain Operations
VIII.0200	Mountaineering Equipment
VIII.0300	Rope management and knots
VIII.0304	one rope bridge
VIII.0305	A-frame
VIII.0600	Belay Techniques

Test Lesson Number

Hours	Lesson Number	Lesson Title
N/A	N/A	

Prerequisite Lesson(s)

-M005, Risk Management for Mountain Operations
-M008, Rope Management and Knots, VIII.0300.03, VIII.0300.04 VIII.0300.06,VIII.0300.10, VIII.0300.11, VIII.0300.18, VIII.0300.21, VIII.0300.22
-M009, Anchors, VIII.0400.01, VIII.0400.02
-M015 Rope Installations (rappels), VIII.0803.05
-M016, Rope Installations (one rope bridge), VIII.0804
-M011, Belay Techniques, VIII.0600
-M012, Roped Climbing, VIII.0700
-M016, Rope Installations (one rope bridge), VIII.0804
-M017, Rope Installations (A-frame), VIII.0805
-M013, Rope Installations (Fixed Rope), VIII.801.01, VIII.801.01, VIII.801.02, VIII.801.03

References

Number	Title	Date	Additional Information
FM 3-97.6	Mountain Operations	NOV 00	
FM 3-97.61	Military Mountaineering	AUG 02	
NA	USARAK NWTC Mountain Operations Manual	FY 2003	
NA	Risk Management for Mountain Operations	FY 2003	

Student Study Assignment

Read TSP M013f

Instructor Requirements

MIQC graduate, TAITC graduate

Additional Support Personnel Requirements

Minimum 3 instructors

Equipment Required

Instructor Equipment:

- Mountaineering helmet
- 1 x rope, static kernmantle, 11mm x 50m
- 1 x webbing, nylon, 1" x 9.5 ft.
- 1 x webbing, nylon, 1" x 25 ft.
- 1 x carabiner, locking, "D" shaped aluminum
- 4 x carabiner, non-locking, oval steel
- 1 x rope, dynamic kernmantle, 7mm x 6 ft.
- 1 x rope, dynamic kernmantle, 7mm x 12 ft.
- 2 x logs 3 to 4 " thick x 8 to 12 feet long

Student Equipment:

- Mountaineering helmet
- 1 x rope, static kernmantle, 11mm x 50m
- 1 x webbing, nylon, 1" x 9.5 ft.
- 1 x webbing, nylon, 1" x 25 ft.
- 1 x carabiner, locking, "D" shaped aluminum
- 4 x carabiner, non-locking, oval steel
- 1 x rope, dynamic kernmantle, 7mm x 6 ft.
- 1 x rope, dynamic kernmantle, 7mm x 12 ft.

Pen and notepad

Materials Required

Instructor Materials:

- TSP
- Risk Management for Mountain Operations

Student Materials:

- SH-1 Advance sheet
- Risk Management for Mountain Operations

Classroom, Training Area and Range Requirements

Mountaineering training/testing area large enough to facilitate 24 students working in a group and 3 SGL. Training area must have a far and near side anchors with loading and unloading platforms so the rope installation may be set-up.

Ammunition Requirements

None

Instructional Guidance

Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

Branch Safety Manager Approval

NAME	Rank	Position	Date
Mark Gilbertson	**GS-09**	**Training Specialist**	

Proponent Lesson Plan Approvals

NAME	Rank	Position	Date
Peter Smith	**GS-12**	**Training Administrator**	

SECTION II **INTRODUCTION**

Method of instruction: Small Group
Type of instruction: Class
Instructor to student ratio: 1:8
Time of instruction: 2 Hours
Media used: None

Motivator

The suspension traverse is a variation of the one rope bridge used to move personnel and equipment. It is ideally suited to moving larger amounts of equipment down a face when rappelling with the load would be difficult. It is normally installed at an angle from the top to the bottom of the pitch, but may also be used on a horizontal plane in place of the standard one rope bridge to move heavier equipment across an obstacle. It is normally installed along main supply routes to assist large unit movements. Like the one rope bridge, the maximum distance the suspension traverse can span is approximately 1/2 to 2/3 the length of the rope in use.

Terminal Learning Objective

ACTION:	Establish a suspension traverse
CONDITION:	In a field environment given a single pitch on 4th or 5th class terrain, with adequate loading and unloading platforms, a suitable natural anchor at the loading and unloading platforms, a 50 meter 11mm Kernmantle or 120 foot Army Green line rope, and a climbing rack with adequate hardware and sling material
STANDARD:	Establish a suspension traverse IAW the NWTC Mountain Operations Manual.

Safety Requirements

Ensure that students:

- Receive a risk assessment prior to movement to the training area and before practical exercises.
- Have all necessary equipment for the PE's, to include any additional equipment required by the NWTC SOP.
- Have two full canteens and drink adequate water to avoid becoming dehydrated.
- Receive a briefing on the symptoms of heat injury or cold weather injury, as appropriate.

Risk Assessment Level

Determined by instructor

Environmental Considerations

None

Evaluation

You will be evaluated on this task during the Mountain Stakes portion of training as per the NWTC training schedule for this course.

Instructional Lead-in

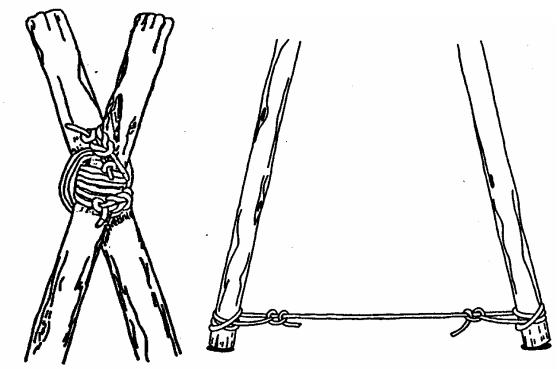
You have already learned how to set up both a one-rope bridge and an A-frame. Now we will go one step further and work on the suspension traverse. The suspension traverse is a variation of the one rope bridge used to move personnel and equipment over difficult or impassable terrain. It is ideally suited to moving large amounts of equipment down a steep rock face when rappelling with the load would be difficult.

SECTION III **Presentation**

ELO A

ACTION:	Assemble an A-frame
CONDITION:	In a field environment given an area which artificial height is needed, a platform, 2 sturdy poles, and adequate hardware and sling material
STANDARD:	Assemble an A-frame IAW with the NWTC Mountain Operations Manual.

Learning Step Activity 1 - Assemble an A-Frame



To assemble the A-frame:

a. Select two sturdy poles. The exact size of the poles depends on the amount of load that will be placed on the system and how much height is needed. Generally, the poles will need to be about 10 feet long, and about 3-4 inches in diameter to support a typical load. The following terms are used to refer to the parts of an A-frame.

Apex- near the top of the A-frame where the poles cross

Butt Ends- bottom of the A-frame poles that are placed on the ground. The larger ends of the poles should be used for the butt ends.

b. Place the two poles in place as they would be in the finished installation and mark the location of the apex on both poles. Ensure that proper height is attained and that the apex of the A-frame will run in a straight line with the system. Also attempt to find natural pockets in which to place the butt ends of the poles.

c. With a 16 ft X 11mm rope, tie a clove hitch around either pole at the apex marking. Leave approximately 18 inches of this rope at one end of the clove hitch. Ensure the locking bar of the clove hitch is toward the outside of the poles, away from the apex.

d. Place both poles side-by-side and wrap the long end of the rope six to eight times horizontally around both poles, wrapping down toward the butt ends. It may be necessary to join another rope to the first by using a square knot. This knot should be positioned on the outside of one of the poles so as not to interfere with the vertical wraps to be made next. Make at least one additional wrap below the square knot before starting the vertical wraps. The square knot should be finished with overhand knots around the tail portions only.

e. After completing the last horizontal wrap, stand the A-Frame up and spread the legs slightly. Place a half-hitch around the pole that does contain the clove hitch and start the vertical wraps. Make 4 to 6 “fraps”, vertical wraps, or around the horizontal wraps, pulling each frap tight to make a secure apex.

f. On the second to last frap, place a non-locking carabiner the rope. The use of this carabiner will be explained during the installing a belay portion of the class.

g. On the last frap pass the rope between the poles above the horizontal wraps and tie it off to the 18 inch end of rope coming from the clove hitch with a square knot. The wraps should be so tight that the overhand knots securing the square knot will not be able to be tied around any of the wraps. Tie the overhand knots in the tail ends only as close to the knot as possible.

h. Once the Apex is tied, a "spreader rope" is used to prevent the legs from spreading farther than you wish. Use another rope, (7 mm), and attach one end to each leg about 3 inches above the butt ends with a clove hitch, securing both ends around the standing part of the rope with two half-hitches. Though not typically used in this manner, these hitches grip the poles well, allow for quick adjustment of the spreader rope, and are safe to use in this application.

ELO B

ACTION:	Install a suspension traverse
CONDITION:	In a field environment given a single pitch on 4th or 5th class terrain, with adequate loading and unloading platforms, a suitable natural anchor at the loading and unloading platforms, a 50 meter 11mm Kernmantle or 120 foot Army Green line rope, and a climbing rack with adequate hardware and sling material.
STANDARD:	Install a suspension traverse IAW the NWTC Mountain Operations Manual.

Learning Step/ Activity 1- Building a Suspension Traverse

Like the one rope bridge, the maximum distance the suspension traverse can span is approximately 1/2 to 2/3 the length of the rope in use.

a. Site Selection:

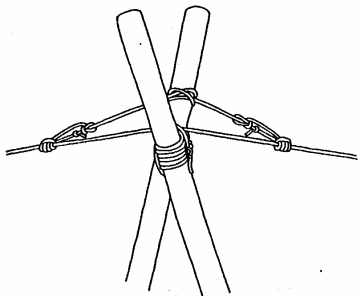
1. The crossing site must again have bombproof anchors at the near (top) and far side (bottom) of the obstacle and suitable loading and unloading platforms. An A frame is normally used to gain sufficient height at the loading platform to allow clearance for the load.

b. Installation:

1. Anchor two ropes to either the near or far anchor and establish a transport tightening system at the opposite end of each rope, as in the one-rope bridge. The transport tightening system may be installed at either end, whichever appears more feasible.

2. The A-frame is placed in such a manner that both ropes run over the apex and the A-frame splits the angle formed by the rope between the near and far anchors. The apex of the A-frame must be directly in line with the near and far anchors. The "plane" of the A-frame must be perpendicular to the ropes. This is easily checked by ensuring the angle between the ropes and spreader rope is 90º.

3. Anchor the A-frame to the load rope in the following manner: Find the center of a 7 mm X 12 ft rope and tie a clove hitch. Place the clove hitch over one of the poles 3 inches above the apex so that the locking bar of the clove hitch is to the inside of the A-frame. Secure both ends of this rope to the load rope, one above and one below the A-frame, with prussik knots. This rope is referred to as the "stabilizing" rope.



4. Tighten the “load rope” and at the same time adjust the A-Frame so that it best supports the system. Secure the A-Frame in place by adjusting the stabilizing rope so the A-frame cannot move. The system should not be tightened by more than 3 individuals.

5. The second rope spanning the obstacle is simply used as a back up for safety in case the first tight rope fails under load. It should be tightened only enough to take out the excess slack so it runs parallel to the load rope. Ensure there is padding between the A-frame, and both ropes. The padding should not cover any knots There should be very little tension on the back-up rope.

c. Establishing the belay:

. 1. Stack a dynamic rope behind the near side anchor.

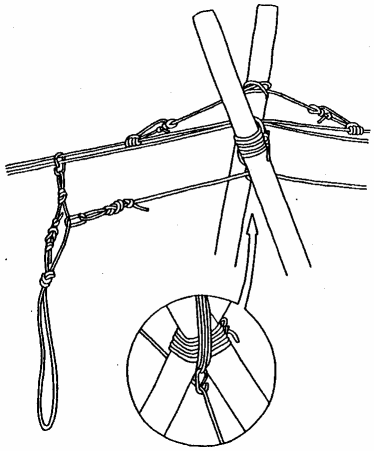
2. Attach a short sling to the nearside anchor and attach the belay rope to it using a carabiner. (this is to redirect the rope to a separate anchor.

3. Establish another anchor on the near side to establish a belay. This anchor should be located away from the loading platform but should be close enough to the edge to observe the personal or equipment while riding the suspension traverse. Use a “direct belay” where the munter hitch is tied directly to the anchor using a pear-a-biner. Restack the rope if necessary.

ELO C

ACTION:	Demonstrate proper movement techniques on a suspension traverse.
CONDITION:	In a field environment given an established suspension traverse and a climbing rack with adequate hardware and sling material.
STANDARD:	Demonstrate proper movement techniques on a suspension traverse IAW the NWTC Mountain Operations Manual.

Learning Step /Activity 1- Preparing to Move on a Suspension Traverse



a. Prepare personnel and equipment for movement on a suspension traverse:

1. To prepare personal and equipment you must first make a carry rope using a 11mm x 16ft kernmantle rope. This is done in almost the same manner as one-rope bridge. You tie the ends of

a rope together with a double fisherman knot. Position the knot one-third of the distance down the loop formed and tie two overhand knots. One above and one below the double fisherman knot. This forms two small loops and one large loop which is longer than the two small loops combined with the overhand knot in the middle loop.

2. Attach the first small loop to a locking carabiner (use large locking steel D carabiner). Attach this carabiner to both ropes with the gate facing down and towards you. Load on the same side of the rope as you would when ridding a one rope bridge.

3. Attach the belay rope to the middle loop using a figure eight loop and a carabiner. Make sure that the belay rope is routed through the carabiner attached to the bottom of the apex. Attach the carabiner to the side without the double fisherman's knot. If the suspension traverse is near horizontal, a second rope may be needed to pull the load across and should be attached to the carry rope in the same manner as the first, but on the same side of the loop as the double fisherman's knot..

4. Route the large loop through either the person's harness or the equipment being transported and attach this loop into the locking carabiner. Lock the carabiner.

5. Re-inspect and use proper belay commands.

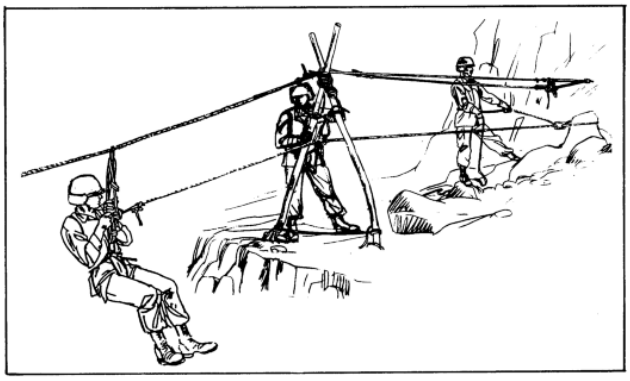


Figure 6-13. Suspension traverse in progress.

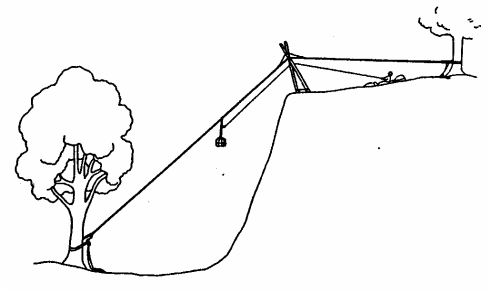
6. Descent of personnel or equipment must be belayed in a slow, controlled manner. Belaying through the Munter hitch attached to the anchor allows the belayer to get closer to the edge where he can observe the operation. The belay should anchor himself for safety if working near the edge. If the belayer cannot see the entire descent route, a signal man should be used to relay commands. The signal man should also be anchored off if working near the edge.

ELO D

ACTION:	Recover a suspension traverse
CONDITION:	In a field environment given an established suspension traverse and a climbing rack with adequate hardware and sling material.
STANDARD:	Recover a suspension traverse IAW the NWTC Mountain Operations Manual.

Learning Step/ Activity 1 - Recovering the Suspension Traverse

The suspension traverse is not as readily retrievable as the one rope bridge. It is normally dismantled by the installing team after its use is no longer needed.



SECTION IV **SUMMARY**

Check on Learning

a. What does the size of the poles depend on?
On the amount of load that will be placed on the system and how much height is needed

b. How many fraps are used?
4 to 6

c. What does the large loop on the carrier rope do?
Run through the load or rappel seat and hook back into the carabiner.

Review and Summarize Lesson

ACTION:	Establish a suspension traverse
CONDITION:	In a field environment given a single pitch on 4th or 5th class terrain, with adequate loading and unloading platforms, a suitable natural anchor at the loading and unloading platforms, a 50 meter 11mm Kernmantle or 120 foot Army Green line rope, and a climbing rack with adequate hardware and sling material.
STANDARD:	Establish a suspension traverse IAW the NWTC Mountain Operations Manual.

Transition to next lesson

As per NWTC training schedule; dependant upon course in conduct.

SECTION V	STUDENT EVALUATION
Testing Requirements	**Students will be tested on this task during the Mountain Stakes portion of training as per the NWTC training schedule for this course.**
Feedback Requirement	**Students will receive two opportunities to pass each event tested. Re-training will be conducted for students that fail the first iteration of testing. Refer to M020 for specifics.**